

SECTION 523 REINFORCED CONCRETE HORIZONTAL ELLIPTICAL PIPE CULVERTS

523.1 Description

- (1) This section describes furnishing and installing reinforced concrete horizontal elliptical pipe culverts, or reinforced concrete apron endwalls.

523.2 Materials

523.2.1 General

- (1) Use materials conforming to the requirements for the class of material named and specified below.

523.2.2 Reinforced Concrete Horizontal Elliptical Pipe

- (1) Provide reinforced concrete horizontal elliptical pipe for culverts conforming to AASHTO M207, for the class of pipe specified, except for the following requirements. The concrete mixture shall not contain less than 565 pounds of cementitious materials per cubic yard. Use one of the following combinations of cementitious materials in the concrete:
 - Portland cement only.
 - Portland blast furnace slag cement only.
 - Portland pozzolan cement only.
 - A combination of portland cement and fly ash where the fly ash is between 15 and 35 percent by weight of total cementitious material.
 - A combination of portland cement and ground granulated blast furnace slag where the slag is between 15 and 35 percent by weight of total cementitious material.
 - A combination of portland cement, fly ash, and ground granulated blast furnace slag in a ternary mixture where the combined weight of the fly ash and ground granulated blast furnace slag is between 15 and 35 percent by weight of total cementitious material.

- (2) Regardless of the pipe's basis of acceptance, place reinforcement according to AASHTO M207.

- (3) Furnish reinforced concrete horizontal elliptical pipe of the class the contract designates.

523.2.3 Reinforced Concrete Apron Endwalls

- (1) For horizontal elliptical pipe culverts use reinforced concrete apron endwalls manufactured with reinforcement and concrete conforming to the pertinent requirements for class HE-II reinforced concrete horizontal elliptical pipe as specified in [523.2.2](#) and as the plans show.

523.3 Construction

- (1) Construct as specified in [520.3](#) for pipe culverts.
- (2) Excavate, shape, and backfill the pipe foundation as specified in [520.3](#) for pipe arches.
- (3) If required, install joint ties for reinforced concrete horizontal elliptical pipe conforming to the plan details.

523.4 Measurement

- (1) The department will measure the Culvert Pipe Reinforced Concrete Horizontal Elliptical bid items acceptably completed as specified for pipe culverts in [520.4](#).
- (2) The department will measure the Apron Endwalls for Culvert Pipe Reinforced Concrete Horizontal Elliptical bid items acceptably completed as specified for apron endwalls in [520.4](#).

523.5 Payment

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
523.0100 - 0299	Culvert Pipe Reinforced Concrete Horizontal Elliptical Class HE-III (size)	LF
523.0400 - 0499	Culvert Pipe Reinforced Concrete Horizontal Elliptical Class HE-IV (size)	LF
523.0500 - 0699	Apron Endwalls for Culvert Pipe Reinforced Concrete Horizontal Elliptical (size)	EACH

- (2) Payment for the Culvert Pipe Reinforced Concrete Horizontal Elliptical bid items is full compensation for providing, hauling, and placing the pipe, geotextile joint wrapping, and joint ties if required; for all excavating, including foundation or bed, and any associated dewatering; for providing and placing granular backfill or graded aggregate for granular foundation or cushion; for backfilling unless granular backfill is specified; for maintaining temporary drainage; and for replacing damaged installations. The

department will pay separately for cast-in-place concrete and alternate endwall installations under the Concrete Masonry Endwalls bid item as specified in [504.5](#) and other associated bid items.

- (3) Payment for the Apron Endwalls for Culvert Pipe Reinforced Concrete Horizontal Elliptical bid items is full compensation for providing, transporting, and installing the apron endwalls; for all excavating, including forming bed; and for backfilling unless granular backfill is specified.
- (4) The department will pay for backfilling with granular backfill as specified in [520.5](#).